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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/606,839	06/28/2000	James P. Kardach	042390.P7017	6948

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EXAMINER	
BANANKHAH, MAJID A	
ART UNIT	**PAPER NUMBER**
2127	

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/606,839	KARDACH, JAMES P.	
	Examiner	Art Unit	
	Majid A Banankhah	2127	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This final office action is in response to amendment, filed August 5, 2004. Application's argument has been fully considered but they are not deemed to be persuasive. Claims 1-20 are presented for examination.

2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior Office action.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-11, 13-15, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over MacDonald (U.S. Pat. No. 6,295,574, hereinafter MacDonald) in view of Simpson (EP. Pat No. 0742522A, hereinafter Simpson).

Per claim 1, teaches, Receiving a real time analog data (col. 5, lines 17-32, RT peripheral 114, data measured from a device) at a personal computer (Fig. 1, CPU 102) implementing a general purpose operating system (multi-tasking operating system, col. 1, Lines, 15-26),

generating real time interrupt indicating a request to process real-time data at a central processing unit (col. 5, lines 33-54, interrupt service routine RTI peripheral 114, and processing time within the device cannot exceed the sample interval (real-time), CPU 102, see also, col. 3, lines 46-63); and

processing the real-time data if the real time interrupt has a higher priority than the non real-time operation (col. 4, lines lines 41-50, **Execution of the currently executing task is suspended and execution of the RTI [real time interrupt] service routine is initiated**, See also col. 6, line 67 to col. 7, line 5, **Preferably, the real time interrupt is the highest priority interrupt within CPU 102**). Non real time operation is any operation such as currently executing interrupt process in the above-cited paragraph or currently executing task.

While the system of MacDonald suggesting the highest priority assignment to be given to real time interrupts (See MacDonald col. Preferably, the real time interrupt is the highest priority interrupt within CPU 102, col. 6, lines 67 to col. 7, line 5) he fails to explicitly teach of a step or means for determining the real time interrupt has a higher priority than a non-real time operation being processed at the CPU (real time interrupt and non real time operation). However, the reference of Simpson teaches of a method and means for handling multiple priority interrupt requests wherein arbitration circuit is provided for determining a priority status for each interrupt signal with the highest priority status and output circuitry and an outputting circuitry, operable to output an interrupt signal only in response to an interrupt signal having a higher priority status than any currently executing interrupt process (see, Simpson, col. 1, lines 34-56, **interrupt request signal only in response to an interrupt signal having a higher priority status than any currently executing interrupt process**). In here Simpson explicitly compare the priority of an interrupt signal with the priority of an operation.

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use priority determination scheme of Simpson in the real time interrupt handling system of MacDonald, for the reason to be able to direct processors attention to high priority real time data than processing the less urgent or non real time data. Simpson suggests the motivation in col. 1, lines 22-29.

Per claim 2, continuing processing the first event if the real-time event does not have a higher priority than the first process. In the system of Simpson, by default, when there is no higher priority interrupt than the currently running process (operation), the priority of the running process is higher and therefore, the process continues to run without interruption. See Simpson, interrupt signal only in response to an interrupt signal having a higher priority status than any current executing interrupt process. Which clearly means if the interrupt signal does not have higher priority than the any executing operation [interrupt signal], the interruption will not be selected and therefore, the preemption in the system of MacDonald would not happens. For the reason that the system of MacDonald is preempted just in response to high priority interrupt.

Per claim 3, the context and state of the executing task is saved before the interrupt service routine is executed and the states are restored after execution of the real-time high priority) data is executed (see, MacDonald, col. 43-63, and col. 2, lines 18-39).

Per claims 4 and 5 are rejected for the reason explained in the rejection of claim 1. Furthermore, the method of Simpson, determine the priority among interrupts and make a determination as to which interrupt has the highest priority (see, Simpson, col. 1, lines 34-56). It would have been obvious that the processing will continue once the priority of the real time is not higher than the priority of the real time, because the arbiter looks at the priority and does not know whether the data is real time or not. Additionally, in the system of Mac Donald the preemption occurs only when the RTI has a higher priority (See MacDonald col. 4, lines 26-50).

Per claim 6, the claim is rejected for the reasons stated in the rejection of claim 4, and the reference of Simpson further teaches of returning to execution of the interrupted process, meaning that the interrupted process is terminated when the arbiter receives a higher priority interrupt.

Per claim 7, a chipset (Fig. 1, 102), a bus coupled to the chipset (bus bridge 106); and a central processing unit (CPU 103), coupled to the bus (CPU 102), to generate a real-time interrupt (RT Peripheral 114) upon receiving real time analog data (col. 5, lines 33-54, interrupt service routine RTI peripheral 1 14, and processing time within the device cannot exceed the sample interval (real-time), CPU 102). While the system of Mac Donald suggesting the highest priority assignment to be given to real time interrupts but fails to explicitly teach of processing data associated with real time interrupt if the real time interrupt has a higher priority than a non real time operation currently being

processed. However, the reference of Simpson teaches of a method and means for handling multiple priority interrupt requests wherein arbitration circuit is provided for determining a priority status for each interrupt signal with the highest priority status and output circuitry and an outputting circuitry operable to output an interrupt signal only in response to an interrupt signal having a higher priority status than any currently executing interrupt process (see, Simpson (see, col. 1, lines 34-56),
processing the real-time event if the real time interrupt has a higher priority 111a11 the non real time operation (col. 1, lines 34-56). Non real time operation is any operation such as currently executing interrupt process in the above-cited paragraph.
Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use priority determination scheme of Simpson in the real time interrupt handling system of MacDonald, for the reason to be able to direct processors attention to high priority real time data than processing the less urgent or non real time data. Simpson suggests the motivation in col. 1, lines 22-29.

Per claim 8, timer is inherent in an interrupt service routine disclosed in MacDonald (See also col. 3, lines 35-44, clock cycle), and generating real time interrupt is taught in col. 3, lines 46-63.

Per claim 9, processing real time interrupt is taught by MacDonald in col. 3, lines 46-63 (RTI), Simpson teaches of detail of an interrupt handler (see, Simpson col. 8, lines 9-42).

Per claim 10, register to store real time data is shown by MacDonald (see Abstract, registers allocated for real time use are indicated in the RTI register).

Per claim 11, as discussed in the rejection of claim 1, the reference of Simpson teaches of relative priority between real time interrupt and non real time operation.

Per claim 13, the claim is rejected for the reasons stated in the rejection of claims 8-10.

Per claims 14 and 20 using radio signal, as analog data does not modify the method of MacDonald, therefore, it is obvious to use radio serial as analog data if this is users desire.

Per claim 15, Simpson teaches of interrupt handler in col. 1, lines 34-65 (indication is held by storage circuitry and selecting the one interrupt serial with highest priority status).

Per claim 19 and generating real time interrupt in response to receiving timing signal from the timer is taught by MacDonald in col. 3, lines 46-63.

5. Claims 12, 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over MacDonald (U.S. Pat. No. 6,295,574, hereinafter MacDonald) in view of Simpson (EP0742522A, hereinafter Simpson), further in view of Williams et al. (U.S. Pat. No.

5,764,582).

Per claims 12 and 16 the modified MacDonald fails to explicitly teach of analog to digital converter, However, the use of analog to distal converter is well known in the art at it is evidenced by Williams, in col. 4, lines 1-37 (D/A and AJD converters), for the reason to be able to process analog data and convert analog into digital. Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use Williams's analog to digital converter.

Per claim 17, registering is taught by MacDonald in the abstract, and col. 3, line 64 to col. 4, line 5.

Per claim 18, the timing signal is created by the clock cycle, and MacDonald teaches storing the interrupting the register in col. 3, lines 46-63.

6. Applicant on pages 8-10 of the Remarks argues in substance:

> "However, MacDonald does not disclose or suggest determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at the CPU, and processing the real-time data if the real-time interrupt has a higher priority than the non-real time operation. In fact, the Examiner has admitted that MacDonald fails to teach of a step or means for determining the real time interrupts among the interrupts (real and non-real time). See Final Office Action at page 3, paragraph 1."

In response, it must be pointed out that first, by definition in a system that there are real-time code or real-time interrupt present, if there is a priority assignment, the real-time code/interrupt has always higher priority than the non-real-time. Additionally, in the art

of computer science when we speak of real-time, it is in comparison with non real-time code/interrupt. The fact MacDonald does not recite "non –real-time", does not means it is not present in his system.

MacDonald in col. 4 lines 41-50 teaches of receiving RTI (real-time Interrupt), followed by RTI selector is read. The selector field is indicative of an address of RTI service routine. Soon after that, the execution of the currently executing task is suspended, and execution of RTI is started. Now, why the execution of the currently executing task is suspended, because, the RTI (Real-Time Interrupt) has a higher priority than the currently executing task (which must be non Real-Time). Where does it teaches that the Real-Time code, operation and/or Interrupt has a higher priority then the non Real-Time, in col. 6, line 67 to col. 7, line 5.

Later on page 7, Applicant argues:

> "Claim 1 of the present application recites a method that includes determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at a CPU, and processing the real-time data if the real-time interrupt has a higher priority than the non-real time operation. Applicant submits that Simpson does not disclose or suggest such a feature. Even though Simpson discloses determining the priority of an interrupt, Simpson still fails to disclose determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at the CPU, and processing the real-time data if the real-time interrupt has a higher priority than the non-real time operation. Determining the priority of an interrupt is not equivalent to determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at a CPU.
> Similarly, since MacDonald and Simpson do not disclose or suggest a method that includes determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at a CPU, and processing the real-time data if the real-time interrupt has a higher priority than the non-real time operation, any combination of MacDonald and Simpson would also not disclose

or suggest such a feature. Accordingly, claim 1 is patentable over MacDonald in view of Simpson."

In response, it is submitted that, first Examiner is not relying on Simpson for the limitations that Applicant argue it does not have. Examiner specifically has cited Simpson for the determination as to whether the priority of the RTI (Real-Time Interrupt) in MacDonald is higher than the priority of the currently executing task (non Real-Time). Even though it this determination must be there otherwise, how does the system of MacDonald can suspend an executing task an start executing a Real-Time interrupt without determining the priority of the RTI is higher than the priority of the currently running task, while he explicitly teaches that the RTI has a higher priority than the RTI is the highest priority interrupt within CPU (See MacDonald col. 6, line 67 to col. 7, line 5). The only reason Simpson is cited because; the determination of the highest priority is not recited explicitly. Once again Examiner re-iterates that MacDonald has all the limitation of claim 1, except the determination is not recited explicitly even though it must be there.

On page 8, Applicant argues:

Applicant submits that the present claims are patentable over any combination of MacDonald, Simpson, and Williams. Williams discloses a bus that is provided to communicate data between a digital signal processor and a hardware interface, which includes digital-to-analog and analog-to-digital converters. Inputs and outputs for the various multimedia end devices are connected through the digital-to-analog and analog-to-digital converter. However, Williams does not disclose or suggest a method that includes determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at a CPU, and processing the real-time data if the real-time interrupt has a higher priority than the non-real time operation.
As discussed above, MacDonald and Simpson do not disclose or suggest such a feature. Since MacDonald, Simpson and Williams do not disclose or suggest a method that includes determining whether a real-time interrupt has a higher priority than a non Real-Time operation being processed at the CPU, and processing the real-time data if the

Real-Time interrupt has a higher priority than the non-real time operation, any combination of MacDonald, Simpson and Williams also would not disclose or suggest determining whether a real-time interrupt has a higher priority than a non-real time operation being processed at the CPU, and processing the real-time data if the real-time interrupt has a higher priority than the non-real time operation. Therefore, the present claims are patentable over MacDonald and Simpson even in view of Williams. Applicant respectfully submits that the rejections have been overcome, and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.
The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

In response one cannot show non-obviousness by attacking the references separately. The Examiner is not relying on this reference to shoe real-time interrupt features of Williams. This reference is used to show that the use of analog to digital conversions of the invention of MacDonald, because he does not explicitly recite that feature event though any hardware interrupt is eventually converted to digital in order for the computer be able to process that interrupt.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. In view of the fact that the claims are not amended since the final office action dated June 7, 2004, **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE

CALCULATED FROM THE MAILING DATE OF THE The application has been amended as follows:
ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Majid A. Banankhah** whose telephone number is (571) **272-3770**. The examiner can normally be reached on Monday – Thursday, 8:00 AM – 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756.

Information regarding the status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Majid A. Banankhah

11/13/04

MAJID BANANKHAH
PRIMARY EXAMINER